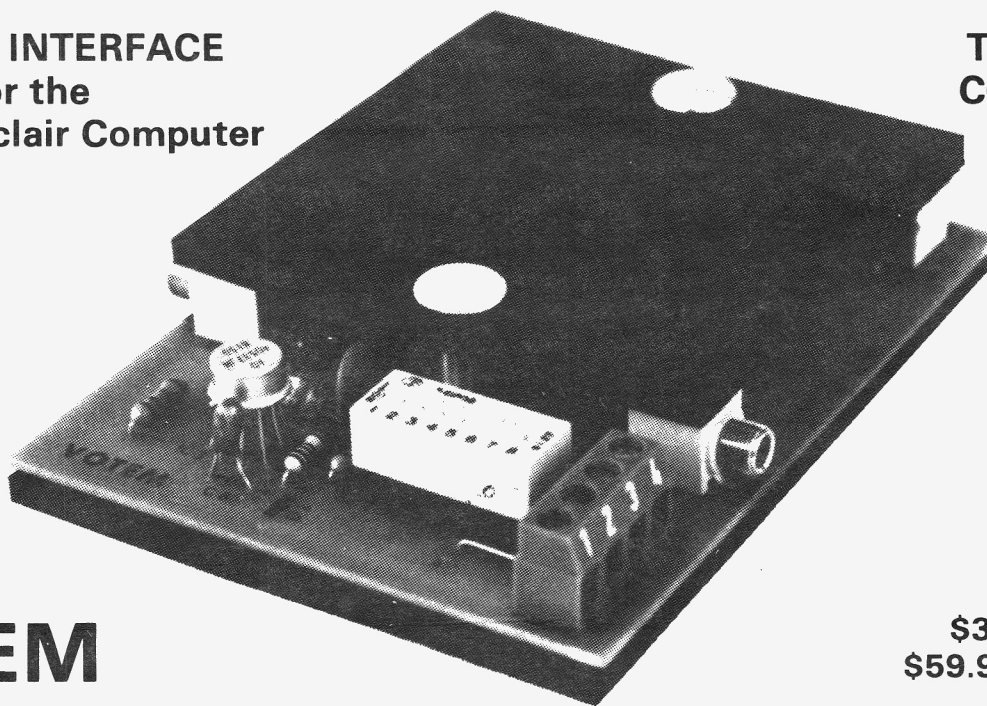# ANALOG INTERFACE
for the
Timex/Sinclair Computer

TAPE SIGNAL CONDITIONER

VOTEM

$39.95 (Kit)
$59.95 (A & T)

VOTEM is a complete package consisting of hardware and software that enables your computer to measure, display and record "real world" analog signals. Your computer can monitor any physical phenomenon (pressure, light, temperature, etc.) that can be represented by a DC voltage. A probe is provided for air and liquid temperature measurements.

Your computer becomes a "smart" digital voltmeter and thermometer with storage capability. Just think of the possible applications. Use VOTEM and your computer to monitor the temperature in a home energy conservation project to save money and possibly qualify for an energy tax credit on the entire system.

VOTEM also amplifies and cleans up the tape signal for reliable program LOADing. The tape signal conditioner circuit will allow you to LOAD tapes with a lower volume setting on your tape recorder, resulting in less noise and more dependable LOADs. You will be able to LOAD from tapes which would previously not comply.

VOTEM requires no modifications to your computer and does not use the computer's expansion connector, leaving it free for other add-ons such as the memory pack and printer.

At only $59.95 (assembled and tested), VOTEM is the world's most cost effective analog interface. For an even better bargain the VOTEM kit is only $39.95. (Requires soldering and appx 2 hrs.) VOTEM comes with a detailed 35-page manual. The manual may be purchased separately for $5 pp and applied to first purchase of a VOTEM unit. If you are not satisfied with VOTEM return within 15 days for a full refund. (Does not apply to kits.) **Send check or money order plus $3 for shipping and handling.**

VOLTAGE MEASUREMENT PERFORMANCE

Resolution	0.000044V (better than 14 bits.)
Accuracy (note 1)	+/- 0.2%
Input Resistance	250 Megohms
Range (note 2)	0 to +1V (without divider network)
Linearity	0.1%

TEMPERATURE MEASUREMENT PERFORMANCE
(specified in degrees C)

Resolution	better than 0.05
Accuracy (note 1)	+/- 0.5
Range	-25 to +125

POWER SUPPLY REQUIREMENTS (note 3)

Operating Voltage	+8V to +15V (unregulated DC)
Current Consumption	25mA (typical)
	15mA without LED

COMPUTER REQUIREMENTS

Timex TS-1000 or Sinclair ZX81. Will also work on ZX80 (w/8K-ROM). Basic measurements and operations require only 1K of RAM memory. Instructions and Z80 source code driver routine are provided for adapting to any Z80 based computer.

OTHER FEATURES

* Schmitt trigger conditioner circuitry for tape signal.
* LED tape LOAD monitor
* Buffered audio output for speaker or earphone.
* Can be used as frequency counter from DC to beyond 30KHz.
* Functions are easily selected with 8-pole DIP switch.
* Self-contained in attractive (1" by 3" by 4") enclosure.
* Temperature probe for air and liquid temperature measurements.
* Glass-epoxy circuit board and high quality components used.
* Input connections are reliable miniature screw terminals.
* Instructions for interfacing to any Z80 system with 1-bit input.
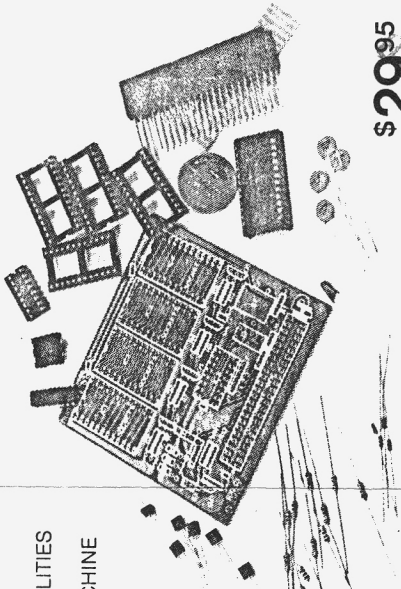* Easy-to-follow, 35-page manual can be purchased separately.

Note 1: All calibration is done in software. The absolute accuracy of VOTEM will depend mainly on the choice of parameters and conversion factors used in the software. If the calibration procedures provided with VOTEM are followed then the accuracy should be as good or better than that specified above.
Note 2: The input voltage range of 0 to+1V can easily be expanded with an on-board resister voltage divider network.
Note 3: VOTEM can be powered from the Timex/Sinclair computer's power supply. The VOTEM unit provides a power-in and power-out receptacles and also includes the proper connecting cable.

Down East Computers

P.O. Box 3096
Greenville, N.C. 27834

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Extend your ZX81/TS1000 System:
Add Memory that won't Forget!

$29.95

plus $1.95 shipping and handling

- ADD YOUR OWN SYSTEM UTILITIES
- BUILD UP A LIBRARY OF MACHINE LANGUAGE SUBROUTINES
- UP TO 8K NONVOLATILE RAM
- USE HM6116LP CMOS RAM OR 2716/2732 EPROM
- LOW POWER BACK-UP
- COMPATIBLE WITH 16K RAM PACKS

by HUNTER

READ THE REVIEWS:

What a super product!...conceived and executed very nice with quality components.

(SYNTAX QUARTERLY Winter 82)

8K Nonvolatile memory is a gem! It has so many possible uses...I recommend this board most heartily.

(OKLAHOMA S.U.G. Newsletter 1/3)

We found the documentation to be far superior to that (of) most hardware we've received.

(S.U.N. Newsletter Nov/Dec 82)

For versatility this is even better than an EPROM...ranks quite high on the list of "must-haves".

(SYNC Magazine Mar/Apr 83)

INTRODUCTION

This memory board is designed to fill the transparent 8K block of memory (from 8 to 16K) in a ZX81-16K system. This area of memory is an ideal place to store, either permanently or temporarily, machine language routines or data which are to be used by the BASIC system.

A sample display routine, a program—merging routine, and procedures for storing utilities on tape are included with the kit.

The use of HM6116LP 2K CMOS RAM memory IC's with their own reserve power supply means that routines stored in the RAM are nonvolatile — the RAM retains its memory even when the ZX81 is switched off or reset. Moreover, being RAM, the routines you store in the memory are easily modified. The lithium cell supplied with the board will maintain sufficient reserve power for almost ten years.

ASSEMBLY

Complete step-by-step instructions in a 20 page manual make assembly of the board easy. Construction takes between two and three hours. The kit (pictured above) is complete with a silkscreened solder-masked printed circuit board, all capacitors, resistors, transistors, sockets, connectors, integrated circuits, and the lithium cell. The board is supplied with one 2K CMOS 6116LP-3 RAM — it will accomodate three more for a total of 8K.

Complete kit with 2K	$29.95
Additional three 6116LP-3	$16.00
Bare pc board & manual	$13.05
Assembled & tested with 2K	$44.95
Assembled & tested with 8K	$59.95
Shipping & handling per order	$ 1.95

Send check or money order to the address below

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